AMENDED SPECIFICATION

Reprinted as amended in accordance with the decision of the Assistant-Comptroller, acting for Comptroller-General, dated the nineteenth day of November, 1937, under Section 21, of the Patents and Designs Acts, 1907 to 1932.

(The Amendments are shown in erased and italic type and in the Drawings)

435,697*

ERRATA

AMENDED SPECIFICATION
No. 435,697*.

Page 1, line 56, *for* " contact " *read* " constant "

Page 2, lines 24 and 25, *for* " Abschmely-sicherungen " *read* " Abschmelz-sicherungen "

Page 2, lines 28 and 29, *for* " $t = \frac{C(q)^2}{I_K}$ " *read* " $t = C\left(\frac{q}{I_K}\right)^2$ "

Page 2, line 43, for " allays " read " alloys "

Page 2, line 68, *for* " closely " *read* " clearly "

Page 2, line 92, *for* " fuses " *read* " fuse "

THE PATENT OFFICE,
February 7th, 1938.

We, ...RIEKEN, ...organis... ...laws of ...having ... Eindhov... Kingdo... declare ... in what ...formed, ...ascertain... ment:—

This i... electric i... ~~ticularly~~— ...prising a ... a wire c... multiple ...

It is kn... of a break... usual lamps comprising an incandescent member in the form of a single helix. Upon burning of the incandescent body arcs readily occur, especially between the ends where the said body is burnt, and may even proceed to such an extent that the arc extends between the supply wires or pole wires within the lamp. In such a case the current strength of this arc formed between the supply wires or pole wires will have such a value that the usual fuses on the switch-board are blown.

In order to avoid this drawback it has already been proposed to provide a fuse in the lamp itself, it being advantageous to insert it in part of a leading-in wire provided in the lamp cap. However, it has turned out that the known construction has serious drawbacks, since upon blowing of the fuse arcs may still occur either between both leading-in wires or between a supply wire and the lamp cap which usually consists of brass.

This phenomenon more particularly ...ect ~~ter~~ ...les-...ese ...ion ...s a ...the ...the ...the ...ate-...erm ...not ...ded ...ach ...on-...isly ...vire ...rom ... the point of view of manufacture.

If a lamp according to the invention and a known lamp having only one fuse provided in one supply wire, whereas the other wire has the usual thickness of several hundreds of microns and consists, for instance, of copper, are compared with one *another* ~~other~~ as regards arc formation the following result is found: With the lamp according to the invention both fuses are blown simultaneously or almost simultaneously. An arc, if any, formed between the two ends of both wires can exist only for a very short time, since the material of at least one of the wires, which material serves as a counter-pole for the arc, immediately fuses up to the ~~bottom~~ *contact* of the cap.

In the known lamps on the contrary when the fuse operates the other thick wire remains undamaged and constitutes a good counter-pole for the arc which consequently is maintained for a long time.

The invention is of particular import-

[*Price* 1/-]

AMENDED SPECIFICATION

Reprinted as amended in accordance with the decision of the Assistant-Comptroller, acting for Comptroller-General, dated the nineteenth day of November, 1937, under Section 21, of the Patents and Designs Acts, 1907 to 1932.

(The Amendments are shown in erased and italic type and in the Drawings)

PATENT SPECIFICATION

Convention Date (Germany): Oct. 14, 1933.

435.697*

Application Date (in United Kingdom): Feb. 24, 1934. No. 6095/34.

Accepted: Sept. 24, 1935.

COMPLETE SPECIFICATION (AMENDED)

Improvements in Electric Incandescent Lamps

We, N. V. PHILIPS' GLOEILAMPENFABRIEKEN, a limited liability Company, organised and established under the laws of the Kingdom of the Netherlands, having our seat and Office at Emmasingel, Eindhoven, Province of North-Brabant, Kingdom of the Netherlands, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a gasfilled electric incandescent lamp ~~and more particularly to an incandescent lamp~~ comprising an incandescent body formed by a wire coiled two or more times, i.e. a multiple helix such as a " coiled coil."

It is known that in such lamps the risk of a breakdown is greater than in the usual lamps comprising an incandescent member in the form of a single helix. Upon burning of the incandescent body arcs readily occur, especially between the ends where the said body is burnt, and may even proceed to such an extent that the arc extends between the supply wires or pole wires within the lamp. In such a case the current strength of this arc formed between the supply wires or pole wires will have such a value that the usual fuses on the switch-board are blown.

In order to avoid this drawback it has already been proposed to provide a fuse in the lamp itself, it being advantageous to insert it in part of a leading-in wire provided in the lamp cap. However, it has turned out that the known construction has serious drawbacks, since upon blowing of the fuse arcs may still occur either between both leading-in wires or between a supply wire and the lamp cap which usually consists of brass.

This phenomenon more particularly occurs with high voltages and with direct current. ~~, as will be explained hereinafter by reference to the drawing~~.

Due to the construction of the incandescent lamp according to the invention these drawbacks are greatly reduced.

In the lamp according to the invention each of the leading-in wires contains a fuse which is made of bare wire and the end of which is attached at ~~or near~~ the corresponding contact of the cap, the short-circuit contact (C) of the fuse material being less than 300.10^6. The term " bare " means that the fuse is not directly covered by or wholly embedded in insulating material. The whole of each leading-in wire from the cap contact onward up to the pinch is advantageously constituted by a wire fuse. Such a wire has proved to be most favourable from the point of view of manufacture.

If a lamp according to the invention and a known lamp having only one fuse provided in one supply wire, whereas the other wire has the usual thickness of several hundreds of microns and consists, for instance, of copper, are compared with one *another* ~~other~~ as regards arc formation the following result is found: With the lamp according to the invention both fuses are blown simultaneously or almost simultaneously. An arc, if any, formed between the two ends of both wires can exist only for a very short time, since the material of at least one of the wires, which material serves as a counter-pole for the arc, immediately fuses up to the ~~bottom~~ *contact* of the cap.

In the known lamps on the contrary when the fuse operates the other thick wire remains undamaged and constitutes a good counter-pole for the arc which consequently is maintained for a long time.

The invention is of particular import-

[*Price* 1/-]

Price 4s 6d

ance for lamps in which the outer contacts are provided at the botttom of the cap, which caps are known as bayonet or Swan caps.

We have found that the conditions which must be satisfied by the material of the fuses for the purpose under review are as follows:—

1. Upon fusing of the wire the quantity of vapour produced should be as small as possible, i.e. the vapour pressure at the melting point of the material of the fuses should be as small as possible. The vapour may tend to promote the production of an arc between a supply wire and the metal cap.

2. The time of fusing of the cut-out should be as small as possible in order that, for instance, in the case of an arc being produced between the parts in question of the supply wires, these parts fuse down as soon as possible.

According to the formula of Meyer ("Zur Theorie der Abschmelysicherungen," Druck and Verlag von R. Oldenbourg, 1906, page 36), the time of fusing is:—

$$t = \frac{C(q)^2}{I_k}$$

where t is expressed in seconds, the wire diameter q in cm and the short-circuit current I_k in amps. According to the invention the constant C (short-circuit constant of the material used) is less than 300×10^6.

The constant (factor C) given for this particular purpose according to the invention holds good for an initial temperature upon fusing of 15° C. (room temperature). Thus it appears that all materials are not adapted for this purpose. For copper, for instance, $C = \pm 676.10^6$.

Nickel and nickel allays on the contrary are eminently adapted for carrying out the invention. These materials such as constantan, nickel chromium, the material known under the Registered Trade Mark "Monel" metal, konel metal and the like satisfy not only both first mentioned conditions but also the third condition viz. that the material should be resistant to corrosion.

This condition is very important when considering that in the case under review very thin wires, for instance, of 150 microns with a limit current of 2.5 amp. are concerned, which must practically be kept in stock for a long time and should consequently not be liable to corrosion.

Finally it is remarked that the lamp according to the invention is perfectly protected against any risk of breakdown and consequently also against breakdowns between the supply wire and the cap, if the cap is coated internally with insulating material, for instance, with an insulating lacquer.

The invention will be more closely understood by reference to the accompanying drawing, representing, by way of example, two embodiments thereof.

Fig. 1 shows a lamp having a screw cap (so-called Edison cap), and

Fig. 2 represents a lamp having a Swan-cap.

An incandescent body 21 (Fig. 1) having the form of a double helix is located in the bulb 1. The cap 3 is cemented to the bulb at 8 and is constituted by the usual brass thread. The supply conductors are designated by 4 and 5, the pinch by 6. The parts AB and CD are constituted by a fuse. With the so-called Edison cap only one contact 15 is provided in the bottom of the cap.

When, for instance, the wire 5 fuses at P the wire 4 fuses simultaneously or almost simultaneously. In this case an arc might be produced between the free ends of the wires 5 and 4 hanging down from the bottom of the cap (Fig. 1). Since, however, the wires 4 *and 5* directly fuses down to the points A *and C* an arc is unlikely and, if produced, can exist only for a very short time. The production of an arc between the wire 4 (for instance, the point Q) and the cap may be avoided by coating the cap 3 internally with an insulating lacquer layer 7.

In Fig. 2 a Swan cap 9 is cemented to the bulb 10 at 14. The parts U—V and X—Y of the leading-in wires 11 and 12 are constituted as fuses. The wires may readily approach closely to each other in such a manner that when both wires fuse an arc R is produced, for instance, over the distance TS. In this case, however, ~~one~~ *each* of the wires immediately fuses over its whole length. Practically no arc formation occurs over the distance U—X.

It will be appreciated that in these forms of construction of the invention any danger of arc formation is avoided.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A gasfilled electric lamp having an incandescent body formed by a wire coiled two or more times, in which each of the leading-in wires contains a fuse which is made of bare wire and the end of which is attached at ~~or near~~ the corresponding contact of the cap, the short-circuit constant (C) of the fuse material being less than 300.10^6.

2. Gasfilled electric incandescent lamps

susbtantially as described and as illustrated.

Dated this 24th day of February, 1934.

DICKER, POLLAK & MERCER,
Chartered Patent Agents,
20—23, Holborn, London, E.C.1,
Agents for the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1937.

[This Drawing is a reproduction of the Original on a reduced scale.]

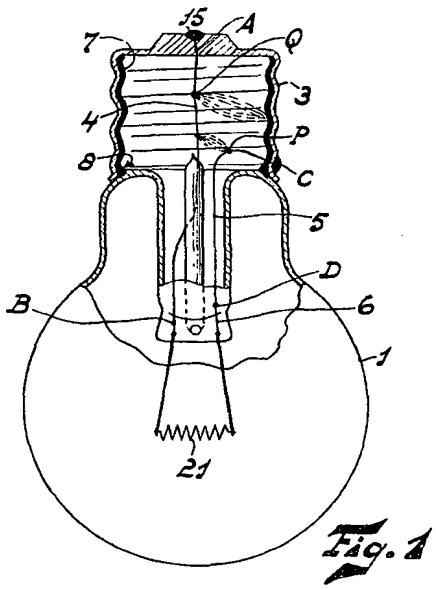

Fig. 1

(Cancelled Drawing)

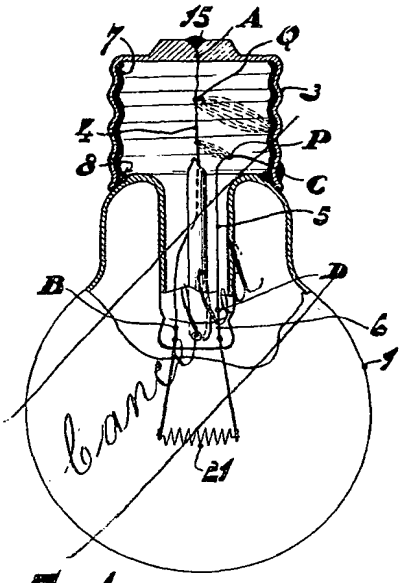

Fig. 1a.

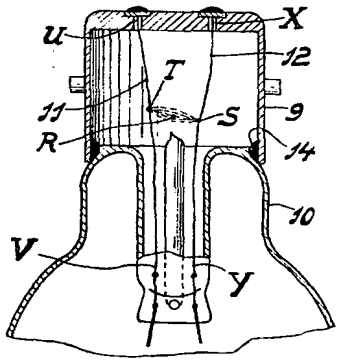

Fig. 2

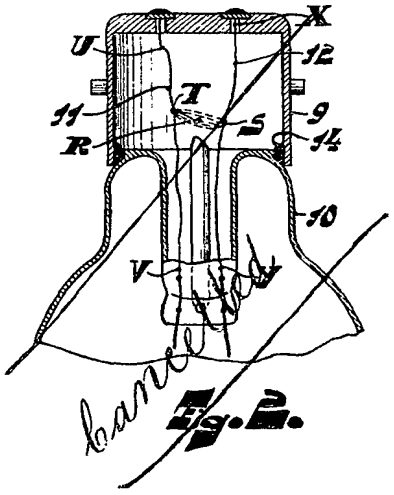

Fig. 2a.

Malby & Sons, Photo-Lith